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Species Diversity of Marine Sponges along Chanthaburi and Trat Provinces, the Eastern Coast of the Gulf of Thailand

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Abstract Species diversity of marine sponges was investigated in various habitats along the coast and islands of Chanthaburi and Trat provinces during February to May 2006. Sample collection was conducted from 18 sites, mostly carried out by wading and SCUBA diving during daytime and the observations were randomly conducted in all collection sites. The results showed that 72 species from 11 orders, 37 families and 52 genera were identified. Out of these, three species were the new records from Thai Waters, namely *Placospongia melobesioides, Eurypon* sp. "black" and *Rhabderemia* sp. "brown". Most species were previously found in the Gulf of Thailand and the South China Sea. Species occurrence in various habitats was noted for some common sponges.

Key words: Marine sponges, Porifera, the Gulf of Thailand

Introduction

Chanthaburi and Trat provinces are located on the easternmost area of the eastern coast of the Gulf of Thailand (Fig. 1). These provinces play important roles as providing a nursery for both economically and non-economically important fauna. The coral reef system in this area is distinct from those of the other areas in the Gulf of Thailand in having barrier reef (Chao Loa reef) and

Fig. 1. Study area: Chanthaburi: A, Chao Loa reef; B, Ko Nom Soa, Trat: C, Ko Chang group, D, Ko Mak & Ko Rung, E, Ko Kut group

associated algae and seagrass beds (Ko Chang group). Putchakarn (2007) reviewed the literatures on sponges in the Gulf of Thailand and reported 45 demosponge species from the Had Khanom - Mo Ko Thale Tai National Park, in the southern part of the Gulf of Thailand. The purpose of the present study is to investigate the species diversity and distribution of marine sponges along the coast of Chanthaburi and Trat provinces to provide baseline study for subsequent investigations on the diversity and distribution of marine sponges in the Gulf of Thailand.

Materials and Methods

Collections. Sample collections were conducted in the coastal habitats along the Chanthaburi and Trat provinces, covering 18 sites of five locations (Fig. 1), during February to May 2006. Specimens were collected by wading and SCUBA diving during daytime, and observations were randomly made at all collection sites. The specimens were photographed *in situ* and notes were made based on morphological and ecological features such as colour, depth, and substrate. Specimens were preserved in 70% alcohol and deposited at Institute of Marine Science, Burapha University, Thailand.

Laboratory work. Histological sections were made tangentially and perpendicularly to surface of the sponge with a scalpel. Sections were dried on a slide warmer and subsequently mounted in Canada balsam, and examined under a light microscope. Spicule preparations were made by putting fragment of sponge in boiling concentrated nitric acid, washed and centrifuged 3 times in distilled water and 3 times in 95% alcohol, and suspended in 95% alcohol. Spicule suspensions were pipetted onto microscopic glass slides, dried and mounted in Canada balsam for light microscopy. Spicules were measured based on 25 randomly chosen spicules for each category (Putchakarn et al., 2004; Putchakarn, 2006). Systematics follows Hooper and Van Soest (2002). Technical term follows Boury-Esnault and Rützler (1997).

Results and Discussion

During this study, 72 species (44 species to exact species level) of 52 genera, 37 families and 11 orders of class Demospongiae were found (Table 1 and Fig. 2). Of these, 29 species were reported from Chanthaburi province and 63 species from Trat province. Most species are common components in marine benthic habitats in the Gulf of Thailand and in the South China Sea (Chaitanawisuti et al., 2002; Hooper et al., 2000; Putchakarn, 2006, 2007). The most abundant and common sponges in this area were *Xestospongia testudinaria* (Lamarck) and *Xestospongia* sp. "purple" which were found in all locations, while *Spheciospongia congenera* (Ridley), *Clathria (Thalysias) reinwardti* Vosmaer, *Gelliodes petrosioides* Dendy, *Neopetrosia* sp. "blue", *Dysidea arenaria* Bergquist, *Spongia* sp., *Hyrtios erectus* (Keller) and *Pseudoceratina* sp. were found in four locations. Order Poecilosclerida (21 species) showed the highest species diversity, followed by Haplosclerida (18 species), while *Xestospongia testudinaria* and *Xestospongia* sp. "purple" (Haplosclerida) were the most common species. Three species from Chanthaburi and Trat provinces were the new records from Thai Waters, namely *Placospongia melobesioides*, *Eurypon* sp. "black" and *Rhabderemia* sp. "brown". Eight species were possibly new species: *Plakina* sp.1, *Plakina* sp.2, *Raspailia (Raspaxilla)* sp. "red", *Eurypon* sp. "black", *Rhabderemia* sp. "brown", *Xestospongia* sp. "purple", *Dysidea* sp. "blue" and *Pseudoceratina* sp. "yellow". Unfortunately these sponges were found to be rare species, mostly had small sample fragment and had not previously been studied in Thailand.

Several sponges from this study merit additional notes; *Tetilla japonica* Lampe appears to be especially found in sandy bottom offshore and somewhat turbid water areas of the eastern coast of Thailand. *T. japonica* is indicated as marine non-indigenous species in Thailand since type locality of this species was in Northern Japan (Chavanich et al., 2010; Lampe, 1886;). *Plakina* sp.1, *Plakina* sp.2, *Ecionemia acervus* Bowerbank, *Rhabderemia* sp. "brown", *Placospongia melobesioides, Raspailia* sp. "black" and *Halichondria cartilaginea* Esper were found only in Ko Chang group and needed further

Table 1. Species list and distribution of sponges from Chanthaburi and Trat provinces, the Gulf of Thailand

Study locations, Chanthaburi: 1, Chao Loa reef; 2, Ko Nom Soa, Trat: 3, Ko Chang group, 4, Ko Mak & Ko Rung, 5, Ko Kut group
Distribution, X, present; -, absent

Taxa	*Distribution*				
	1	*2*	*3*	*4*	*5*
Class DEMOSPONGIAE Sollas, 1885					
Order HOMOSCLEROPHORIDA Dendy, 1905					
Family Plakinidae Schulze, 1880					
1. *Plakina monolopha* Schulze, 1880	-	-	-	X	-
2. *Plakina* sp.1	-	-	-	X	-
3. *Plakina* sp.2	-	-	-	X	-
Order SPIROPHORIDA Bergquist & Hogg, 1969					
Family Tetillidae Sollas, 1886					
4. *Tetilla japonica* Lampe, 1886	-	-	-	X	-
Order ASTROPHORIDA Sollas, 1888					
Family Ancorinidae Schmidt, 1870					
5. *Ecionemia acervus* (Bowerbank, 1864)	-	-	X	-	-
Family Calthropellidae Lendenfeld, 1907					
6. *Pachastrissa nux* (De Laubenfels, 1954)	-	-	X	-	-
Family Geodiidae Gray,1867					
7. *Sidonops picteti* Topsent, 1897	-	-	X	-	-
Order CHONDROSIDA Boury-Esnault & Lopès, 1985					
Family Chondrillidae Gray, 1872					
8. *Chondrilla australiensis* (Carter, 1883)	X	-	-	X	X
9. *Chondrosia reticulata* (Carter, 1886)	X	-	X	X	-
Order HADROMERIDA Topsent, 1894					
Family Clionaidae D'Orbigny, 1851					
10. *Cliona aurivillii* (Lindgren, 1897)	-	-	-	X	-
11. *Spheciospongia congenera* (Ridley, 1884)	X	-	X	X	X
Family Placospongiidae Gray, 1867					
12. *Placospongia melobesioides* Gray,1867	-	-	-	X	-
Family Spirastrellidae Ridley & Dendy, 1886					
13. *Spirastrellla solida* (Ridley & Dendy, 1886)	-	-	X	-	X
Family Suberitidae Schmidt, 1870					
14. *Terpios granulosa* Bergquist, 1967	-	-	X	X	-
15. *Terpios* sp. "yellow"	-	-	-	X	X
16. *Terpios* sp. "dark green"	-	-	-	X	-
Family Tethyidae Gray 1848					
17. *Tethya seychellensis* (Wright, 1881)	-	-	-	-	X
Family Timeidae Topsent, 1928					
18. *Timea* sp. "yellow"	-	-	X	X	-
Order POECILOSCLERIDA Topsent, 1928					
Suborder MICROCIONINA Hajdu, Van Soest & Hooper, 1994					
Family Microcionidae Carter, 1875					
19. *Clathria (Microciona) aceratoobtusa* (Carter, 1887)	-	-	-	X	-
20. *Clathria (Microciona)* sp. "orange"	X	-	X	X	-
21. *Clathria (Thalysias) reinwardti* Vosmaer, 1880	X	X	-	X	X
22. *Clathria (Thalysias) toxifera* (Hentschel, 1912)	-	X	-	-	-
23. *Clathria (Thalysias)* sp.	-	-	-	-	X
Family Raspailiidae Hentschel, 1923					
24. *Thrinacophora incrustans* (Kieschnick, 1896)	-	-	X	X	-
25. *Echinodictyum asperum* Ridley & Dendy, 1886	X	X	X	-	-
26. *Eurypon* sp. "black"	-	-	X	-	-
27. *Hymeraphia* sp. "red"	-	-	-	-	X

Table 1. Continued.

Study locations, Chanthaburi: 1, Chao Loa reef; 2, Ko Nom Soa, Trat: 3, Ko Chang group, 4, Ko Mak & Ko Rung, 5, Ko Kut group
Distribution, X, present; -, absent

Taxa	*Distribution*				
	1	*2*	*3*	*4*	*5*
28. *Raspailia (Raspaxilla)* sp. "red"	-	-	X	X	-
29. *Raspailia* sp. "black"	-	-	-	X	-
Family Rhabderemiidae Topsent, 1928					
30. *Rhabderemia* sp. "brown"	-	-	-	X	-
Suborder MYCALINA Hajdu, Van Soest & Hooper, 1994					
Family Desmacellidae Ridley & Dendy, 1886					
31. *Biemna fortis* (Topsent, 1897)	-	-	X	X	-
Family Isodictyidae Dendy, 1924					
32. *Coelocarteria singaporensis* (Carter, 1883)	-	-	-	-	X
Family Mycalidae Lundbeck, 1905					
33. *Mycale (Mycale) grandis* Gray, 1867	-	-	X	-	X
34. *Mycale (Zygomycale) parishii* (Bowerbank, 1875)	X	-	X	X	-
Suborder MYXILLINA Hajdu, Van Soest & Hooper, 1994					
Family Coelosphaeridae Dendy, 1922					
35. *Lissodendoryx (Waldoschmittia) schmidti* (Ridley, 1884)	-	-	-	-	X
Family Hymedesmiidae Topsent, 1928					
36. *Phobas* sp. "orange"	X	-	-	-	-
Family Iotrochotidae Dendy, 1922					
37. *Iotrochota baculifera* Ridley, 1884	X	-	X	X	-
Family Crambeidae Lévi, 1963					
38. *Monanchora unguiculata* (Dendy, 1922)	-	-	-	X	X
39. *Monanchora* sp. "orange"	-	-	X	X	-
Order HALICHONDRIDA Gray, 1867					
Family Halichondriidae Gray, 1867					
40. *Halichondria cartilaginea* Esper, 1794	-	-	X	-	-
41. *Amorphinopsis siamensis* (Topsent, 1925)	-	-	-	-	X
Family Dictyonellidae Van Soest, Diaz & Pomponi, 1990					
42. *Scopalina australiensis* (Pulizer-Finali, 1982)	-	-	-	-	-
Order HAPLOSCLERIDA Topsent, 1928					
Suborder HAPLOSCLERINA Topsent, 1928					
Family Chalinidae Gray, 1867					
43. *Haliclona (Halichoclona)* sp. "white"	-	-	-	X	-
44. *Haliclona (Halichoclona)* sp. "yellow"	-	-	X	X	-
45. *Haliclona (Halichoclona)* sp. "purple"	-	-	X	-	-
46. *Haliclona (Haliclona)* sp. "brown"	-	-	-	-	X
47. *Haliclona (Reniera)* sp. "yellow"	X	X	-	-	-
48. *Haliclona (Rhizoniera)* sp. "blue"	-	-	-	X	X
49. *Haliclona (Soestella)* sp. "black"	X	X	-	-	-
Family Callyspongiidae de Laubenfels, 1936					
50. *Callyspongia (Cladochalina) subarmigera* Ridley, 1884	-	-	-	-	X
Family Niphatidae Van Soest, 1980					
51. *Amphimedon* sp.	X	-	-	-	-
52. *Dasychalina fragilis* (Ridley & Dendy, 1886)	-	-	X	X	X
53. *Gelliodes petrosioides* Dendy, 1905	X	X	X	X	-
Suborder PETROSINA Boury-Esnault & Van Beveren, 1982					
Family Petrosiidae Van Soest, 1980					
54. *Neopetrosia* sp. "blue"	X	X	X	X	-
55. *Petrosia (Petrosia) hoeksemai* De Voogd & Van Soest, 2002	X	X	-	-	-
56. *Petrosia (Petrosia)* sp.	-	-	-	-	X

Table 1. Continued.

Study locations, Chanthaburi: 1, Chao Loa reef; 2, Ko Nom Soa, Trat: 3, Ko Chang group, 4, Ko Mak & Ko Rung, 5, Ko Kut group
Distribution, X, present; -, absent

Taxa	*Distribution*				
	1	*2*	*3*	*4*	*5*
57. *Xestospongia mamillata* (Pultizer-Finali, 1981)	X	-	-	-	-
58. *Xestospongia testudinaria* (Lamarck, 1815)	X	X	X	X	X
59. *Xestospongia* sp. "purple"	X	X	X	X	X
Family Phloeodictyidae					
60. *Oceanapia sagittaria* (Sollas, 1902)	X	-	X	X	-
Order DICTYOCERATIDA Minchin, 1900					
Family Dysideidae Gray, 1867					
61. *Dysidea arenaria* Bergquist, 1965	X	-	X	X	X
62. *Dysidea* sp. "blue"	-	X	X	-	X
63. *Lamellodysidea herbacea* (Keller, 1889)	X	-	X	-	-
Family Ircinidae Gray, 1867					
64. *Ircinia mutans* (Wilson, 1925)	X	-	-	X	-
Family Spongiidae Gray, 1867					
65. *Hyattella intestinalis* (Lamarck, 1814)	X	-	-	-	-
66. *Spongia* sp.	X	X	X	X	-
Family Thorectidae Bergquist, 1978					
67. *Hyrtios erectus* (Keller, 1889)	X	-	X	X	X
Order DENDROCERATIDA Minchin, 1900					
Family Darwinellidae Merejkowsky, 1879					
68. *Aplysilla* aff. *rosea* (Barrios, 1876)	-	-	-	-	X
69. *Chelonaplysilla erecta* (Row, 1911)	-	-	X	X	X
Order VERONGIDA Bergquist, 1978					
Family Ianthellidae Hyatt, 1875					
70. *Hexadella racovitzai* Topsent, 1886	X	-	X	-	X
Family Pseudoceratinidae Carter, 1885					
71. *Pseudoceratina purpurea* (Carter, 1880)	-	-	X	-	-
72. *Pseudoceratina* sp.	X	-	X	X	X

studies. *Mycale (Mycale) grandis* Gray and *M. (Zygomycale) parishii* (Bowerbank) are common and widely distributed in the Gulf of Thailand. *M. (Mycale) grandis* is a burrowing sponge and inhabits crevices between the rocks or dead corals but *M. (Zygomycale) parishii* is an encrusting sponge and is usually associated with live bivalve shells or barnacles and occurs on dead gorgonians. *Petrosia (Petrosia) hoeksemai* De Voogd & Van Soest has differential morphologies and is common in high sedimentation areas such as Chao Lao reef and Ko Nom Soa. *Ircinia mutans* (Wilson) also live in high sedimentation habitats such as on reef slope and on the outer reef in soft-bottom areas. *Halichondria cartilaginea* and *Lamellodysidea herbacea* (Keller) are common in the upper subtidal zone of coral reefs exposed to sunlight. *Xestospongia* sp. "purple" is thick encrusting sponge, usually found in the shaded area or in the cave of huge coral head.

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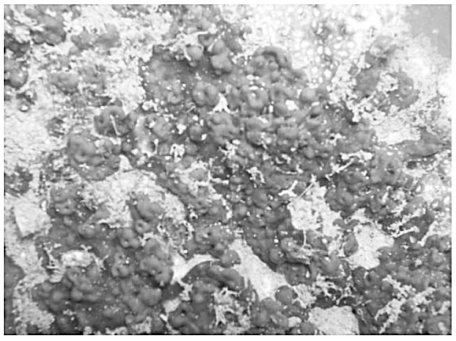
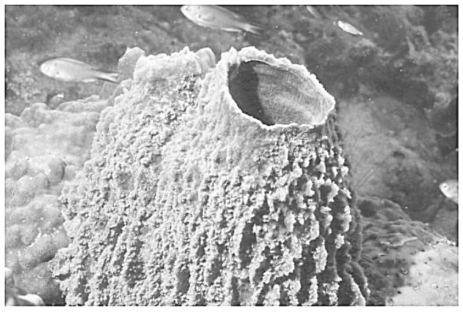
Ecionemia acervus (Bowerbank)

Placospongia melobesioides Gray

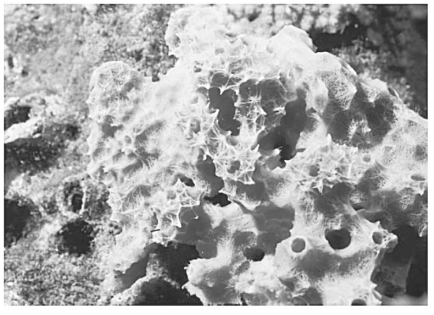


Rhabderemia sp. “brown”

Halichondria cartilaginea Esper



Xestospongia testudinaria (Lamarck)



Dasychalina fragilis Ridley & Dendy

Oceanapia sagittaria (Sollas)

Dysidea arenaria Bergquist

Fig. 2. Underwater photos of some marine sponges from the Chantha-Buri and Trad provinces

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